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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,028	07/22/2003	Raja Banerjee	9	9533

7590 08/27/2004

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Locust Valley, NY 11560

EXAMINER

MUNOZ, GUILLERMO

ART UNIT PAPER NUMBER

2637

DATE MAILED: 08/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/625,028

Applicant(s)

BANERJEA, RAJA

Examiner

Guillermo Munoz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-21 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. Applicant is requested to provide PTO-1449 to list all articles mentioned on pages 1 and 2 in the specification.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 6, 8, 11, 13, 15, 16, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belotserkovsky et al. in view of Kataoka et al..

Regarding claim 1; Belotserkovsky et al. disclose almost all the subject matter "a demodulator...representative of the phase error difference" claimed as follows. Belotserkovsky et al. do not explicitly teach "a demodulator configurable for receiving a passband, however the functionality of elements 28-34 are the same; Belotserkovsky et al. teach an OFDM symbol

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frame having training symbols, i.e. reference symbols, note Fig. 2, element 52; a carrier frequency offset compensation circuit, note element 62 of figure 3; a transformation circuit, note element 46 of figure 3; an equalizer circuit, note element 68 of figure 3; and a CFO estimation circuit, note element 72 of figure 3; Belotserkovsky et al. teach an error metric proportional to the degree of adjacent channel interference is used to compensate for frequency offset; the error metric can be a standard deviation of the decision-directed LMS error, note paragraph 0028. The LMS error is a measure of phase error between the equalizer output and a slicer output. The deviation of the LMS error is a measure of difference in phase error between symbols. However, Belotserkovsky et al. does not expressly state the use of a slicer circuit in generating the LMS error.

Kataoka et al. teach an OFDM carrier offset compensation circuit which estimates frequency offset at the receiver by measuring phase changes using an adaptive LMS algorithm, note Fig. 5 in page 1078 and equation 9 in page 1077.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Belotserkovsky et al.'s equalizer with Kataoka et al.'s teaching of using an adaptive equalizer including a frequency-offset estimator, since Belotserkovsky et al. suggest in paragraph 0028, a decision-directed least mean square error can be used to generate the error metric.

Regarding claim 3, Belotserkovsky et al. further teach the claimed subject matter "fast Fourier transform", note element 46 of Fig. 3.

Regarding claim 5, Belotserkovsky et al. further teach the claimed subject matter "filter", note elements 42 and 44 of figure 1.

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Regarding claim 6, Belotserkovsky et al. further teach the claimed subject matter “low-pass filter”, note elements 42 and 44 of figure 1.

Regarding claim 8, Kataoka et al. further teach the claimed subject matter “slicer”, note the reference generator of Fig. 5.

Regarding claim 10, Kataoka et al. further teach the claimed subject matter “viterbi decoder” in figure 8.

Regarding claim 11, Kataoka et al. further teach the claimed subject matter “based at least in part on a difference”, whereby a difference is equivalent to a phase change.

Regarding claim 12, Belotserkovsky et al. further teach the claimed subject matter in paragraph 0028.

Regarding claim 13, see claim 1.

Regarding claim 15, see claim 3.

Regarding claim 16, see claim 5.

Regarding claim 18, see claim 8, wherein the claimed subject matter are inherent characteristics of a slicer circuit.

Regarding claim 19, see claim 11.

Regarding claim 20, Belotserkovsky et al. further teach the claimed subject matter “adjusting the phase” by the inherency of the operation of the carrier frequency adjustment.

Regarding claim 21, see claim 1.

Claims 2, 7, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belotserkovsky et al. in view of Kataoka et al. and Terry et al..

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Regarding claim 2; as applied to claim 1, Belotserkovsky et al. teach an OFDM receiver having post transformation carrier offset estimation.

Terry et al. teach theory and practices applied to OFDM receiver systems having pre and post transformation carrier offset estimation. Terry et al. disclose that in a Post transformation carrier offset estimation at least two consecutive repeated symbols are required, note chapter 2, Frequency Synchronization.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Belotserkovsky et al.'s carrier offset estimate with Terry et al.'s teaching of using at least two consecutive repeated symbols to generate the frequency offset estimate, since Terry suggest in chapter 2, Frequency Synchronization that two consecutive repeated symbols are required.

Regarding claim 7; as applied to claim 2, Terry et al. further teach that in an IEEE 802.11a Receiver the first block in the receiver chain performs the function of removal of the symbolic cyclic prefix, note chapter 2, IEEE 802.11a Receiver.

Regarding claim 9, as applied to claim 2, Terry et al. further teach that in an IEEE 802.11a Receiver the demodulator block operates in a quadrature amplitude mode.

Regarding claim 14, see claim 2.

Regarding claim 17, see claim 7.

***Allowable Subject Matter***

The following is a statement of reasons for the indication of allowable subject matter:

Claim 4 is considered allowable because the invention comprises a carrier frequency offset compensation circuit having a rotor element for shifting the phase of a baseband symbol based on a measured phase error difference taken from two channel equalized symbols for the purpose of compensating for carrier frequency offset in an OFDM receiver. The closest prior art Belotserkovsky et al. teach a similar OFDM receiver having a carrier offset adjustment circuit for adjusting the phase of a baseband symbol based on a measured phase error difference taken from two channel equalized symbols for the purpose of compensating for carrier frequency offset, however, Belotserkovsky et al. fails to teach the phase adjustment being performed using a rotor element for phase shifting the baseband signal. This distinct feature has been included in dependent claim 4, thereby claim 4 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 703-308-7728. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

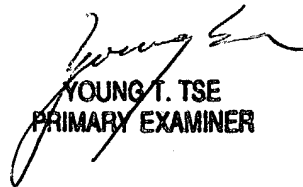


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



GM  
August 18, 2004



YOUNG T. TSE  
PRIMARY EXAMINER